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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,808	10/10/2006	Yosuke Endo	SAT-16887	4898

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EXAMINER	
DANEGA, RENEE A	

ART UNIT	PAPER NUMBER
3736	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,808	ENDO ET AL.	
	Examiner	Art Unit	
	Renee Danega	3736	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim1, 3, 12, and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastair et al. (US 3418662) in view of McBean et al. (US 20040106881).

- Regarding claims 1 and 14, Alastair teaches an external force control method and program for controlling an external force applied to an orthosis attached to the animal that makes a movement along with activities of the muscle fibers comprising a myoelectric potential measurement step of measuring a myoelectric potential that occurs in the body, and external force setting step of setting a value of an external force applied to the animal through the orthosis according to an external for function f(x) with the myoelectric potential as a variable on the basis of the measured value of the myoelectric potential; a motion variable measurement step of measuring a motion variable varying with the motion of the animal under the condition of the external force applied through the orthosis, a determining step for determining whether a deviation between the set value of the factor and target value is less than a reference value

and an external force function setting step of setting a new external force function in such a way that the new set value of the factor approaches the target value if the deviation is equal or greater than the reference value of the determination step (Figure 1) (column 2, lines 40-62) (column 3, lines 6-65). Alastair doesn't expressly teach the force control to apply the force to the animal through the orthosis nor an external force function setting step in which a shift to a separate function occurs. However, McBean teaches a movement assistance method for exerting a force on an animal via an orthosis in which first and second functions are determined based myoelectric signals of a second body portion, an exerting a force on a first portion with force feedback at the first portion and on the desired opposite movements of the joint and further a feedback is provided of force applied such that it can be kept proportional to a function of the magnitude of the myoelectric signals (abstract) (Figure 1, 2) [0061] [0062]. It would have been obvious in view of McBean to provide the feedback method in Alastair in order to provide rehabilitation to a limb of the animal.

- Regarding claim 3, Alastair teaches the external for function step comprising finding the external force target value according to the factor function on the basis of the measured value of the motion variable and the target value of the factor and setting the external force function in such a way that the external force approaches the external force target value (claim 1).

- Regarding claim 12, Alastair teaches the method of determining to depend on the deviation being positive or negative relative to the threshold (column 5, lines 65-74).
- Regarding claim 13, this claim states the apparatus that performs the steps of the method of claim 1, thus the same rationale of rejection is applicable.
- Regarding claims 15-20, McBean's first and second living body portions comprise a common living portion of the body, namely the arm but can be used on the leg (Figure 1) [0022].

3. Claims 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastair modified by McBean as applied to claim 1 above, and further in view of Curcie et al. (US 6660042).

- Regarding claim 2, Alastair modified by McBean doesn't teach the external force function setting step to comprise setting a coefficient that represents the relation between the myoelectric potential and the external force and setting the external force function according to a basic function of the myoelectric potential and coefficient. However, Curcie teaches a method for distributing forelimb forces in which each finger is assigned a coefficient or weight related to external force (Figure 2). It would have been obvious in view of Curcie to find coefficients in Alastair modified by McBean's method relating to myoelectric potential and force for each finger to individualize digit control.

- Regarding claim 5, Alastair modified by McBean doesn't teach omitting the determination step. However, Curcie teaches a method in which there is a training mode in which the function variables are determined in a training step and then the mode is switched to a use mode in which the equation for each finger remains constant (Figure 2). It would have been obvious in view of Curcie to provide for determination to be omitted in Alastair modified by McBean's method in order to allow for repeated uniform actions.

4. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alastair modified by McBean as applied to claims 3 and 1 above, and further in view of Haslam, II et al. (US 5413611).

- Regarding claim 4, Alastair modified by McBean doesn't teach the external force setting step comprise setting an external force function such that the maximum measured value of the external force approaches the maximum value of the target. However, Haslam teaches a force control method in which the external force is controlled in such a way that the maximum measured force approaches the maximum target (column 10, lines 27-35). It would have been obvious in view of Haslam to provide for the external force to not exceed the target force in Alastair modified by McBean's device as this could damage whatever object is being gripped.

5. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastair modified by McBean as applied to claim 1 above, and further in view of Kawai et al (US 20040107780).

- Regarding claims 7-8, Alastair modified by McBean doesn't teach the motion variable step to include measuring a primitive motion variable varying with the motion of the animal and measuring the motion according to inverse dynamics model nor the motion state being determined by the primitive motion variable relative to the motion state. However, Kawai teaches an external force control method in which primitive motion variables (26) are measured and inputted to an inverse dynamics model (70) along with motion state data (21, 22, 23) in order to determine the motion state (Figure 3). It would have been obvious in view of Kawai to use this method in Alastair modified by McBean's force control method in order to account for secondary forces that are effecting the resulting force execution.

6. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alastair modified by McBean as applied to claim 1 above, and further in view of Davalli et al. (US 6740123).

- Regarding claim 9, Alastair modified by McBean doesn't teach the setting factor step depending on the measured values of external force and motion. However, Davalli teaches four band factors each depending from the bend of the wrist and EMG activity feedback which result in different

force controls (Figure 3b). It would have been obvious in view of Davalli to provide for different factors to be set for different external forces in Alastair modified by McBean's device in order to control different body parts.

- Regarding claim 10, Alastair modified by McBean doesn't teach the motion state determination step to depend in a primitive motion variable and a motion state wherein there is a new external force function responsive to each motion state. However, Davalli teaches motion state determination depending on a primitive motion variable (elbow bend) and motion state (elbow active) and a new force function for each motion state such as operate right and left wrists, flex and extend elbows (Figure 3b). It would have been obvious in view of Davalli to provide different force functions to correspond to different motion states in Alastair modified by McBean to provide for varying activity.
- Regarding claim 11, Alastair modified by McBean doesn't teach the determination step to comprise whether the deviating is less than the reference value on the basis of a target value factor for each motion state and the external force setting step comprising a new external force function on the basis of factor target value. However, Davalli teaches the determination step comprising whether the deviation is less than the reference value (bend or travel unit in figure) on the basis of three reads or factor target values that influence which force function is employed (Figure 3b). It would have been obvious in view of Davalli to provide a

determination step of comparing value deviations in Alastair modified by McBean in order to ensure appropriate force exertion.

- Regarding claim 14, Alastair modified by McBean and Davalli teach the limitations of the external force control utilizing myoelectric potential, external force setting, motion variable measurement, factor setting, determining, and setting an external force function (see above). Alastair doesn't teach providing the functions on a computer program. However, Davalli teaches a processor with expansion properties (18) allowing additional programming instructions (Figure 2). It would have been obvious at the time of invention in view of Davalli to provide a program to a computer to control the device of Alastair modified by McBean.

Response to Arguments

7. Applicant's arguments filed 4/3/09 have been fully considered but they are not persuasive.

Applicant argues that Alastair doesn't teach applying an external force to an animal. However, Alastair teaches setting a value of an external force applied to an appliance meant to function as a missing animal part. Further, McBean teaches using partial prostheses. It would have been obvious to one of ordinary skill to use a force feedback mechanism to control whatever is remaining of the animal in the same manner as a total prosthesis to achieve the end goal of natural limb movement. Employing a partial prosthesis such as McBean with Alastair's force feedback would permit usage of existing immobile or partially mobile limbs. Alastair does teach measuring a motion

variable of the sum of an external and internal force as summing emg (internal) and force clamp circuits from the external force feedback (column 2, lines 65-67).

Response to Arguments

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

9. The new McBean reference teaches a control method employing EMG signals and force signals from the joint being acted upon in a feedback configuration in order to control an orthosis as cited above and seen in figure 2. Although Alastair doesn't provide feedback from a second living body portion, it is believed McBean cures this deficiency and would permit Alastair's driving method to be used with both prosthetics and orthotics.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renee Danega whose telephone number is (571)270-3639. The examiner can normally be reached on Monday through Thursday 8:30-5:00 eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Max Hindenburg can be reached on (571) 272-4726. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RAD

/Max Hindenburg/
Supervisory Patent Examiner, Art Unit 3736